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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/722,651	11/26/2003	Mansoor Ali Khan Alicherry	6-3	7650

7590 12/29/2006	EXAMINER
Ryan, Mason & Lewis, LLP	THORNEWELL, KIMBERLY A
90 Forest Avenue	
Locust Valley, NY 11560	

ART UNIT	PAPER NUMBER
2128	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	12/29/2006	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

	Application No.	Applicant(s)
Office Action Summary	10/722,651	KHAN ALICHERRY ET AL.
	Examiner	Art Unit	
	Kimberly Thornewell	2128	

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>26 November 2003</u>.

2a)☐ This action is **FINAL**.　　2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-29* is/are pending in the application.

　　4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7,9,10,12-21 and 23-34* is/are rejected.

7)☐ Claim(s) *8,11,22 and 25* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>02 February 2004</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

　　Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

　　Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

　　a)☐ All　b)☐ Some * c)☐ None of:

　　　1.☐ Certified copies of the priority documents have been received.

　　　2.☐ Certified copies of the priority documents have been received in Application No. _____.

　　　3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

　　* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
　　Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
　　Paper No(s)/Mail Date _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-29 have been presented for examination.

Claim Objections

2. Claims 9 and 23 are objected to because the term "polynomially" is not a proper term defined

in the English language. Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness

rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
> such that the subject matter as a whole would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the
> manner in which the invention was made.

4. Claims 1-7, 9, 15-21, 23, and 29 are rejected under 35 U.S.C. 103(a) as being obvious over

Bar-Noy et al., "On Chromatic Sums and Distributed Resource Allocation," Information and

Computation 140, 183-202, 1998.

    As per claims 1, 15 and 29,

    Bar-Noy discloses a method of designing a line system, the method comprising the steps

of:

- Obtaining a set of one or more demands for use in computing the line system design (**page 5, Applications first paragraph**, *allocating resources to run jobs and requests*); and

- Representing the line system design as a graph in accordance with a graph coloring operation wherein colors are assigned and the one or more demands are routed so as to attempt to achieve a minimum total design cost (**page 5, Chromatic Sums of Graphs**, *minimum edge color sum*).

It is clearly anticipated that the disclosed equations and formula would be executed on a computer having a memory on a processor, or by a computer-readable medium, as can be seen by the relative complexity of the equations and formula. This can also be seen by the numerous cited references in the Bar-Noy et al. reference dealing with Computer Programming as well as Computing in general.

Bar-Noy does not disclose expressly the colors representing bandwidths. However, **section 5 of the reference, beginning on page 19** discusses the application of the coloring algorithm to the resource allocation problem. Bandwidth is defined as the amount of data that can be sent over a network in a given time. Since in a network total bandwidth cannot exceed a given amount, it is obvious that in a network, bandwidth is a resource to be allocated to the processors of the network in order to execute jobs. In order to minimize the time it takes to complete all tasks, it is necessary to develop a schedule that allocates bandwidth (**page 10 section 5, paragraph 2, theorem 5.1**) to the jobs of the processors. Therefore, it would have been obvious to one of ordinary skill in the art of processor schedule optimization, at the time of the present invention, to modify the teachings of Bar-Noy by assigning the colors to bandwidths

and bandwidths to the demands (jobs) in order to achieve the minimum total design cost. The motivation for doing so, as taught by Bar-Noy, would have been to minimize response time and gain an optimal scheduling algorithm by allocating bandwidth (page 20 lines 1-5).

As per claims 2 and 16,

Bar-Noy discloses the colors being partitioned in sets and the sets being ordered so that colors in higher sets cost more than colors in lower sets (**page 8, section 2.1 paragraph 2,** *independent sets by coloring*).

As per claims 3 and 17,

Bar-Noy discloses a link of the graph representing a location of a component of the line system being designed (**page 5, Applications first paragraph,** *link, i.e. node, representing processors*).

As per claims 4 and 18,

Bar-Noy discloses the cost of a link in a coloring being equal to the cost of the most expensive set such that a demand going through the link is colored with a color in the most expensive set (**page 16 column 4 first paragraph,** *maximal independent set, greedy polynomial having the highest cost*).

As per claims 5 and 19,

Bar-Noy discloses colors being assigned to the demands such that no two demands routed on the same link of the graph are assigned the same color (**page 5, Applications, "Mutual Exclusion"**).

As per claims 6 and 20,

Bar-Noy discloses the line system being a linear line system (**page 7 first full paragraph**, *"line graph"*).

As per claims 7 and 21,

Bar-Noy discloses the line system being a linear line system (**page 7 first full paragraph**, *"interval graph"*).

As per claims 9 and 23,

Bar-Noy discloses the graph coloring operation being polynomially computable (**page 7 first full paragraph**, *"polynomial time"*).

5. Claims 10, 12-13, 24, and 26-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bar-Noy as applied to claims 1-7, 9, 15-21, 23, and 29 above, in view of Shih et al., "An Approximation Algorithm for Coloring Circular-Arc Graphs," Siam Conference on Discrete Mathematics, 1990.

As per claims 10 and 24,

Bar-Noy does not disclose expressly the system being a circular line system. Shih

discloses an algorithm for applying the minimum coloring algorithm to systems wherein the

systems are circular line systems (**page 2 first paragraph lines 1-5**).

It would have been obvious to one of ordinary skill in the art of graph coloring, at the

time of the present invention, to modify Bar-Noy's graph coloring method by employing Shih's

circular line system. The motivation would have been to improve ease of use by employing

circular-line systems verses linear or interval systems (Shih page 2 first paragraph lines 14-16).

As per claims 12 and 26,

When modified with Bar-Noy, it is obvious that one of Shi's links of the graph

(**endpoints page 2 paragraph 2 lines 1-2**) would represent a location of a component of the

circular line system being designed. This is similar to Bar-Noy's nodes in claim 3.

As per claims 13 and 27,

Shih discloses a demand being routed either clockwise or counter-clockwise (**page 2**

paragraph 2 lines 2-5, *demands being placed on arcs*), and the colors being assigned to

demands such that no two demands routed on the same link are assigned the same color (**page 3**

last paragraph line 3-page 4 line 3).

6. Claims 14 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bar-Noy as

applied to claims 1-7, 9, 15-21, 23, and 29 above, in view of Ramaswami et al., "Routing and

Wavelength Assignment in All-Optical Networks," IEEE/ACM Transactions on Networking,

Vol. 3, pp 489-499, 1995.

Bar-Noy does not disclose expressly the system being a optical line system. Ramaswami

discloses an algorithm for applying a minimum cost algorithm to systems wherein the systems

are circular line systems (**abstract paragraph 2, paragraph 3 lines 1-6**).

It would have been obvious to one of ordinary skill in the art of graph coloring, at the

time of the present invention, to modify Bar-Noy's graph coloring method by employing

Ramaswami's optical line system. The motivation would have been to increase flexibility of

Bar-Noy's method by employing an optical line system as opposed to a linear or interval system

(Ramaswami page 4 lines 5-9, using both circuit-switched and optical networks).

Allowable Subject Matter

7. Claims 8, 11, 22 and 25 are objected to as being dependent upon a rejected base claim, but

would be allowable if rewritten in independent form including all of the limitations of the base

claim and any intervening claims.

8. The following is a statement of reasons for the indication of allowable subject matter:

As per claims 8 and 22,

Although Bar-Noy teaches using Big-Oh approximations for graph coloring operations

(section 3.2 second paragraph), where s, or in this case k, is a value proportional to a number of

color sets, the reference does not teach the approximation being $O(sqrt(s))$.

As per claims 11 and 25,

Although Shih teaches using approximations for the graph coloring operations (page 11 theorem 3.6), the reference does not teach the approximation being $2(1+\varepsilon)$.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- US Patent nos. 7,042,846, 6,697,333.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kimberly Thornewell whose telephone number is (571)272-6543. The examiner can normally be reached on 9am-5:30pm M-F.
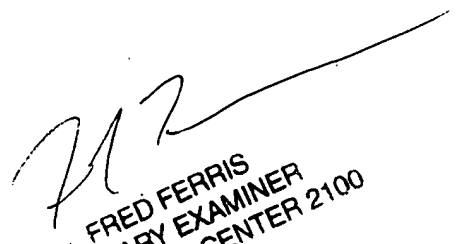
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamini Shah can be reached on (571)272-2279. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications

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information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

<div style="text-align:right">

Kimberly A. Thornewell
Patent Examiner
Art Unit 2128

</div>

KAT

FRED FERRIS
PRIMARY EXAMINER
TECHNOLOGY CENTER 2100